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Why do underground reducing policies often fail their scope? Some answers from the Italian experience

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Why do underground reducing policies often fail their scope?

Some answers from the Italian experience

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Abstract

Several European countries, facing a sizeable underground economy, often adopt underground reducing policies mainly based on incentives in the tax-benefit system. Since empirical evidence manifests a substantial failure of such policies, we construct a simple model to indicate the crucial aspects of this failure. To this end we consider a tax-evading firm, allocating work in the official and underground sector, where it is not taxed. With a view to reducing underground employment, the government may decide to launch an amnesty for past social security non-compliance, whilst providing fiscal incentives for new hiring in order to encourage a process of worker regularization. Allowing for endogenous enforcement, we find that the reputation of policy makers in combating tax evasion proves crucial in determining the success of such a policy.

Key words: Irregular labour input; enforcement; Fiscal Authority efficiency; regularization policy; incentives in the firm's tax structure.

Jel: E26; H25; H26; H32; J18; J23.

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1. Introduction[1]

The aim of this paper is to show the shortcomings of regularization policies targeting underground employment. In this respect we stress the role of the audit probability as an endogenous variable influenced by the efficiency/reputation of the Fiscal Authority.

Recently the European Commission focused attention on underground employment, suggesting that all member States adopt a common strategy against "undeclared work". Since 2001, among the Guidelines for employment policies in Member States, that on "undeclared work" has been systematically reiterated. The Council resolution on transforming undeclared work into regular Employment (2003/C 260/01) suggested: i) simplification of the business environment; ii) the removal of disincentives and the provision of appropriate incentives in the tax and benefits system; iii) improvement in enforcement.[2]

Our analysis will concentrate on the efficiency of policies pertaining to point ii), using the Italian experience of regularization policies as reference. In the European Union, Italy is one of the countries with the largest size of underground employment.[3] In the 1980s and 1990s Italian governments introduced several legislative and administrative measures aiming to contrast it. In a first stage the strategy was to support a process of regularization.[4] In recent years a different

[1] The authors gratefully acknowledge the Italian Ministry of University for the funding provided (PRIN 2006). We thank participants at the seminar held at the University of Bath (UK) for useful comments. Usual disclaimers apply.

[2] See also the Council Decision 2005/600/EC of 12 July 2005 on guidelines for the employment policies of the Member States, Guideline No. 21. Strategies against informal economy have been investigated by Tenguez and Klump (2005).

[3] The National Institute of Statistics (ISTAT) provides a time series estimate of underground employment covering the period 1980-2004 for the country as a whole, rising from 11 to 16% of total subordinate employment. The ISTAT method of estimating the size of underground employment (labour input method) is well described in OECD (2002).

[4] For instance, realignment contracts, fiscal deduction to firms involved in a regularization process; national, regional and provincial committees established to deal with underground employment. See the website of the committee for the "emersion" of non-regular employment: http://www.emersionelavorononregolare.it/.

approach has been implemented, mainly focused on improving enforcement, as stated in the financial law of 2007.

In this paper we perform a comparative static analysis to disentangle the effect of the regularization policy, which is basically modelled as a device to launder former underground labour relationship (such as in Italy with Law 383/2001).[5] With a simple model, which includes the main characteristics of the policy measures set up to reduce shadow employment, we show that their effects may be weak or even perverse. The government offers two incentives to firms shifting labour from underground to official production: a) a settlement for past social security non-compliance; b) a tax cut for the amount of regularized workers. The implicit assumption in our analysis is that tax authorities are unable to ascertain whether the amount of regular employment declared after the settlement is also the full employment engaged in the production process.

One important innovation in our paper is the inclusion of an endogenous probability of being controlled.[6] Enforcement is modelled as a function of regular firm size, taking into account the credibility/efficiency of the Fiscal Authority. The latter issue is crucial in the literature on tax amnesties: depending on the structure of the amnesty program and on the perceived likelihood of repetition, such amnesties can be a tough blow to government credibility, causing perverse effects.[7]

The paper is organized as follows. Section 2 sets up the profit maximization problem in the presence of tax evasion and endogenous enforcement; Section 3 describes the effects of the regularization policy, using calibration techniques; finally, Section 4 concludes the paper.

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[5] We borrow this definition from Das-Gupta and Mookherjee (1996), who study the effects of amnesty in the presence of black asset stocks.

[6] The issue of enforcement has a major role in explaining tax evasion. In the basic model of Allingham and Sandmo (1972) the enforcement policy is reduced to two exogenous parameters, whereas there are more sophisticated combinations of them explored in the literature (Franzoni, 1998). Amongst others, Engels and Hines (1999) investigate the dynamics of tax evasion when retrospective enforcement occurs; Snow and Warren (2005) deal with the effect of audit effectiveness on compliance.

[7] See amongst others, Leonard and Zeckhauser, 1987; Bordignon, 2002; Franzoni, 1996; 2000.

2. The model

Our firm produces a good *Y* with a three-input Cobb Douglas technology:

$$Y_t = \left(L_{R,t}\right)^a \left(L_{U,t}\right)^b \left(K_t\right)^{1-a-b} \qquad a,b>0;\left(a+b\right)<1, \qquad (1)$$

where *K* is the total capital stock, L_R and L_U are the regular and underground labour inputs, *a* and *b* are input elasticities and *t* refers to time. Since we focus on regularization policies targeting underground employment, we write the technology in intensive form, expressing output and labour per capital unit:

$$y_t = {l_{R,t}}^a {l_{U,t}}^b \qquad a,b>0;\left(a+b\right)<1 \qquad (2).$$

In addition, to simplify the analysis, we also assume that the non-labour input is normalized to one and population growth is set to zero; this allows us to consider the size of the firm which operates in this context as exclusively related to the labour input. Moreover, we fix total employment size:

$$l_{R,t} + l_{U,t} = \bar{l} = 1 \qquad \forall t \qquad (3)$$

so that the shift of labour from underground to regular production reads as follows:

$$\Delta l_{R,t} = -\Delta l_{U,t} \qquad (4)$$

When hiring regular workers, firms face a tax rate, τ, on net wage *w*, whereas by employing workers irregularly, firms only pay *w*. However, in this latter situation the firm faces an audit rate, ρ, and a fine, here expressed as a surcharge of the statutory tax rate, *s*.[8] Hence, under tax evasion the cost of labour is:

[8] Corner solutions are excluded by the technology characteristics, since marginal productivity of each input goes to infinity as long as its utilization tends to zero. The following restrictions on enforcement parameters are imposed: i) $s>1$; ii) $\rho<(1/s)$. These imply no income effect of enforcement policy and no corner solutions for regular/irregular labor [for details see Yitzhaki (1974)].

Detected	Probability *(ρ)*	$w(1+\tau)l_{R,t} + w(1+\tau s)l_{U,t}$
Not Detected	Probability *(1-ρ)*	$w(1+\tau)l_{R,t} + wl_{U,t}$

In our simplified framework, the parameter ρ summarizes three different aspects, that we assume to be coincident: the audit rate, the probability of being detected once audited, the probability of paying the fine once detected. In practice they are not concurrent: for instance, though audited and fined, the effective payment may be delayed and also reduced after a court process; there may be competing jurisdictions that may cause delay in the fine application, and so on. All of these may weaken the Fiscal Authority's efficiency, reducing enforcement power. We account for these features by allowing enforcement, ρ, to be an inverse function of the Fiscal Authority's inefficiency, m, which summarizes several aspects, such as the scarce coordination among its departments (Revenue Agency, Customs, Tax Police, Social Security Institutions); the low level of information technology and consequent low productivity; the limits to the power of investigation of the tax police and so on.

In addition, the probability of detection may also be affected by the size of non-compliance, especially when tax evasion refers to social security, since the larger the number of irregular workers, the higher the risk of being reported. Our innovation consists in allowing the enforcement parameter ρ to be endogenous, since it depends inversely on the share of regular labour, l_R.

The following functional form incorporates these assumptions:

$$\rho(l_R, m) = \frac{1 - l_R}{1 + m}; \qquad (5)$$

with the inefficiency of fiscal authorities increasing in m, a parameter ranging between 0 and 1. Thus, the probability of being fined is directly related to the share of irregularity. However, the inefficiency parameter m acts as a discounting factor: as long as inefficiency rises, the probability of

detecting tax evasion is scaled down, and eventually, i.e. for the largest inefficiency *m=1*, halved. Notice that the explicit form in the (5) implies that ε_{ρ,l_R}, i.e. the elasticity of the probability of being audited to the size of regular employment, is a decreasing and convex function of the regular labour input. Therefore, the more regular a firm is, the more a marginal increase in regular employment will lower the risk of being audited.

The behaviour of the endogenous probability is displayed in Figure 1 below.

Figure 1

The moonlighting firm selects the optimal level of regular labour, l_R^* maximizing the following profits function:

$$\pi_t = (l_{R,t})^a \cdot (l_{U,t})^b - w(1+\tau)l_{R,t} - \rho(l_{R,t}, m)w(1+s\tau)l_{U,t} - (1-\rho(l_{R,t}, m))wl_{U,t} \qquad (6)$$

Profit maximization determines the demand schedules of regular (and irregular) work on the basis of all parameters describing technology, tax policy, enforcement, and fiscal authority efficiency. The basic assumption in our formalization is that firms have no expectations about future regularization policies, so that the maximizing problem is akin to a static environment.

3. Effects of underground reducing policies

Given the optimization framework set up in the previous section, it is possible to investigate the effect of a regularization policy promoted by the government. To this end we made the following assumption. First, firms participating in the regularization policy are offered an amnesty fee that is proportional to the size of regularized workers, and they are granted immunity from legal prosecution for self-reported past non-compliance. Second, the government promotes the "emersion" of underground employment, offering a perpetual tax cut for regularized workers.

Third, the measures adopted are followed by declarations of fiscal authority of increasing strictness of enforcement.[9]

Once a regularization policy is offered, the firm evaluates both ***whether*** and ***how far*** to participate in the policy. In this sense, the optimal share of regular labour chosen at time *t*, $l^*_{R,t}$ is a starting point from which the moonlighter might move after the policy, achieving $l^*_{R,t+1}$. It should be noted that amnesties intrinsically imply a dynamic framework, since they refer to past non-compliance, and involve also decisions about future revenues. However, our analysis differs from the standard framework of the tax amnesty since we also allow for a tax deduction aiming to reduce underground employment, that we assume to be perpetual.[10] Since we are mainly interested in the long-run effects of the regularization policy, we adopt a comparative static analysis to investigate the steady state properties without and with the regularization policy. This, of course, prevents us from examining the dynamics of adjustment, and expectation-related issues, that are not the main focus of the present paper, but a matter for future research.

The decision to participate in the regularization process depends upon two crucial parameters: the credibility of a stricter enforcement, which would affect the level of the efficiency parameter *m*; the opportunity cost to adjust regular labour from the previous optimal steady state to the new one. After the policy, the firm faces a new profit function:

$$\begin{aligned} &Max: \\ &\pi_{t+1} = \left(l_{R,t+1}\right)^a \left(l_{U,t+1}\right)^b - w(1+\tau)l_{R,t+1} - \rho\left(l_{R,t+1}, m\right)w(1+s\tau)l_{U,t+1} - \left(1-\rho\left(l_{R,t+1}, m\right)\right)wl_{U,t+1} + w\alpha\Delta l_{R,t+1} \end{aligned} \tag{7}$$

where $\Delta l_{R,t+1}$ indicates the variation in regular employment subsequent to the policy, i.e. the difference between the "with" and "without" policy steady states, and

$$\alpha = \alpha_0 - (\beta + \gamma)(1+\tau) \tag{8}$$

[9] For details on the economics and laws on amnesty policy in Italian experience see Bernasconi and Lapecorella (2007). On the theoretical implication of amnesties see references on Franzoni (2000).

[10] The empirical evidence for Italy shows that incentives to firms have been reiterated for decades, using different forms, and they have often been targeted to support employment.

summarizes the benefits and costs that firms assess in order to decide whether or not to adhere to regularization. This decision is based on the size of fiscal incentive (α_0) but also on the size of the amnesty fee (β) and on the adjustment costs (γ) on regular labour.[11]

The new optimal solution is the one that solves the following non-linear (on regular labour) equation, where endogenous enforcement is explicitly modelled:

$$a\left(l_{R,t+1}\right)^{a-1}\left(1-l_{R,t+1}\right)^{b}+w\left[1+2\left(\frac{1-l_{R,t+1}}{1+m}\right)\tau s\right]+\alpha_0 w=b\left(l_{R,t+1}\right)^{b}\left(1-l_{R,t+1}\right)^{b-1}+w(1+\tau)(\beta+\gamma) \quad (9)$$

In Equation (9) the left hand side (LHS) shows the positive impact of a marginal change in regular employment on profits, whereas the right hand side (RHS) displays the negative marginal effect. From equation (9) we get partial derivatives, whose sign is summarized in Table 1, showing that regular employment is positively affected by fiscal allowances, but also by stricter enforcement. Conversely, the greater the inefficiency of fiscal authority, the lower the effect of the regularisation policy is. Finally, the size of adjustment costs and adhesion cost also impacts on the steady state of regular employment, lowering the effect of the regularization policy.

Table 1: the qualitative effect on regular employment of a marginal change in policy parameters

	Adjustment costs (γ)	Amnesty adhesion fee (β)	Net Incentive to regularization (α)	Enforcement Efficiency (m)	Penalty rate (s)
Sign of the first derivative	-	-	+	-	+

To further specify the solution of the FOC displayed in Eq. 9 it is necessary to take into account the following constraint:

[11] The adjustment costs are consequent to our assumption of a different productivity of the two labour inputs. In fact, regularization implies an additional investment in human capital to raise the productivity of underground employees, i.e. a>b, which can be accounted for by training activities.

$$\alpha \Delta l_{R,t} \geq 0 . \qquad (10)$$

This indicates that when the net incentive is binding (i.e. positive), we expect the firm to increase the size of its regular employment, whereas under a negative incentive no adjustment of the labour allocation occurs.

We can describe the firm's optimal profile of regularization process in two simultaneous steps. First, the firm evaluates the credibility of stricter enforcement, reformulating the value of the enforcement efficiency *m*. Second, it observes the value of the incentive to regularization, comparing it with the adhesion and adjustment costs.

Under these assumptions, we can distinguish the following two cases of interest.[12]

Case 1) $m_t=m_{t+1}$ (no change in the efficiency parameter)

In this case the regularization policy does not change the firm's belief on fiscal authority efficiency. We must distinguish between:

1A) $\alpha > 0$

In this situation $l^*_{R,t+1} > l^*_{R,t}$ and the intensity of regularization will depend on two competing forces: the size of the monetary benefit provided by the policy; the minor risk of auditing consequent to the regularization. As specified above, given the functional form chosen for the endogenous audit rate, the higher the proportion of regularity, the stronger is the latter effect. Therefore, for a given monetary incentive, the effectiveness of the regularization policy is more intense in a context with firms employing a small share of regular workers.

1B) $\alpha \leq 0$

[12] We omit the case of decreasing levels of inefficiency following a declaration of amnesty since its consequence on regularity can be easily obtained by reading case 2 in the opposite direction.

In this circumstance no regularization process occurs, since the incentives for hiring are completely counterbalanced by adhesion and adjustment costs: $l^*_{R,t+1} = l^*_{R,t}$.

Case 2) $m_t < m_{t+1}$ (a worsening of the efficiency parameter)

This situation can occur when the credibility of the government commitment to combat underground practices is very weak. In this case the regularization policy produces a side-effect, that is to worsen the firm's belief in fiscal authority efficiency. As in the previous case we must distinguish between two situations:

2A) $\alpha > 0$

Given the constraint in Eq. 10, we again find $l^*_{R,t+1} \geq l^*_{R,t}$. However, with reference to the case 1A) we observe a further effect impeding the subsidy for regularization which is the inefficiency effect. Therefore, for a given net monetary allowance, we expect to find a steady state solution for regular employment lower than in case 1A).

2B) $\alpha \leq 0$

This is the worse situation for the effectiveness of the policy. Not only is the subsidising policy not binding, but the government announcement to commit to stricter enforcement is not credible. Under these circumstances we have two contrasting forces. On the one hand, the inefficiency parameter pushes toward a reduction in regularity. On the other hand, this perverse effect is counterbalanced by: i) endogenous enforcement; ii) adjustment costs. The net effect will depend on the relative elasticity of probability to the regular employment share and the inefficiency parameter. As discussed above, given the audit function, we may predict that a reduction in the regularity share is more likely for firms with high underground employment.

In the next subsections we simulate the effects of the policy using calibration techniques to solve our model, since the FOC are non-linear.

3.1 Calibration

Our model is calibrated on the Italian economy, as shown in Table 2, but it can be generalized to many European countries with a sizeable underground sector.

Table 2: parameter calibration

a	b	w	τ	s	m	γ	α_0 - β
0.4	0.1	0.5	0.27	1.3	0.25	0.05	0.20

The tax and penalty rates (τ, s) are set respectively to 0.27 and 1.3 according to fiscal and enforcement law evidence.

As to the size of the adjustment cost, we had no precise estimate for Italy, but we relied on estimates for France, a country with quite a similar degree of rigidity of the labour market to Italy.[13] The net size of the fiscal policy to support regularization (α_0, - β) is fixed at a benchmark of 20% to catch the main features of Law 383/2001. The others values were selected to reach a steady state solution of regular labour around 80%. This is a value summarizing different empirical estimates of Italian shadow employment.[14]

3.2 Policy simulation

[13] Abowd and Kramartz (2003) showed, utilizing a data set for French industry, that the costs of hiring (including the training costs) are only about 5% of the annual labour cost, whereas firing costs represent 56%. In general, in countries with strong employment protection, such as many European countries, the costs of separation are considerably larger than those of recruitment.

[14] ISTAT (2005), Schneider and Enste (2000). For details on parameter calibration see also Busato and Chiarini (2004).

Now we can compare the steady state solutions of regular employment with and without the regularization policy, distinguishing the different cases described in the previous section. In the Figures below, we plot on the horizontal axes the size of regular employment and on the vertical axes the two curves LHS and RHS derived from Eq. 9, respectively the positive and negative impact on profits due to a marginal change in regular employment. The steady state solution is at the intersection of the two curves.

Fig. 2

Figure 2 depicts the regular labour input steady state solution before (solid lines) and after the policy (dashed lines) in case 1A. We set the adhesion cost at 0.02 in order to make it beneficial for firms to adhere (i.e. $\alpha>0$). The steady state level for regular employment moves from $l^*_{R,t} \cong 0.7743$ (point X) to $l^*_{R,t+1} \cong 0.7928$ (point Y). The after-policy steady state stresses the effectiveness of the incentive to regularization: the reduction in the tax burden for regularised workers, along with the adjustment costs, modify both sides of Eq. (9). If $\alpha<0$, that is case 1B, no variation will occur in the steady state level (fixed at point X).

Case 2 discloses the role of the fiscal authority's credibility. When the commitment to strict enforcement is not considered consistent with a regularization policy, firms will translate it into an increase in the level of enforcement inefficiency. We raise the inefficiency parameter m from 0.25 to 0.50. As for case 1, we first consider case 2A in which $\alpha>0$. It is visualized in figure 3 below.

Fig. 3

Figure 3 shows that the increase in the inefficiency parameter from 0.25 to 0.50 counteracts the effectiveness of the regularization policy. The new steady state of regular employment is now at $l^*_{R,t+1} = 0.7897$, at point W.[15] This value is above the pre-policy solution (point X) but below the post-policy solution (point Y) obtained under case 1A. Finally, the worst outcome of the

[15] A sensitivity analysis for a set of these parameters confirms the robustness of these results, and is available upon request.

regularization policy, case 2B, is registered when the benefits from the reduction of irregular labor are lower than the adhesion fee and the adjustment cost burden ($\alpha<0$). In such a situation, the fiscal incentive and the amnesty fee do not influence the post-policy steady state, while the firm chooses the optimal size of regular employment taking into account: i) the lower enforcement due to the increase in m; ii) the cost of adjusting regular employment. Under our calibration, the lower credibility of fiscal authorities ($m = 0.25$) associated to the small incentive to regularization produce a new steady state level of regularity at $l^*_{R,t+1} = 0.7608$ (point Z in Figure 4).

Fig.4

4. Conclusions

In this paper we analysed and simulated the effect of underground reducing policies based on incentives to regularization. This policy approach has been frequently adopted in Italy, for instance with Law 383/2001, but without success. The model and simulation exercise help to explain the poor results of the policies adopted in Italy in recent decades. There are at least three major reasons that account for the shortfalls of this approach: the low level of incentives compared to the costs of adhering to amnesty, the high level of labour adjustment costs and, finally, the effect on the firm's efficiency assessment of the fiscal authority.

This analysis supports the change in the approach, pivoting on controls and enforcement, adopted by Italian fiscal authorities in combating underground employment. Of course, the previous policy approach, mainly based on tax deduction, was supported by different motivations, among which the contribution of the underground economy to income certainly played a major role.

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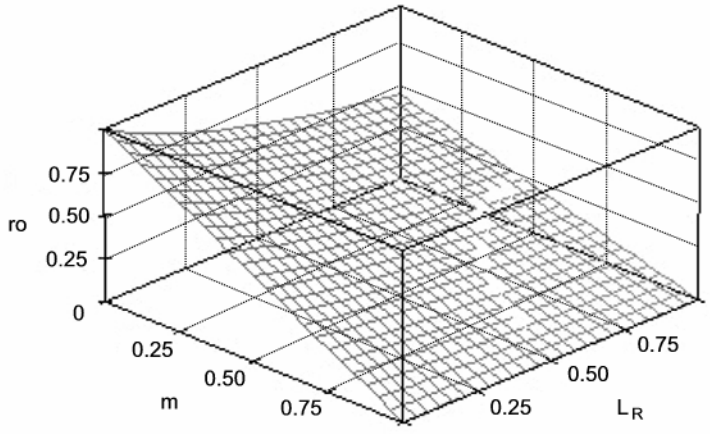

Figure 1: endogenous probability of being caught

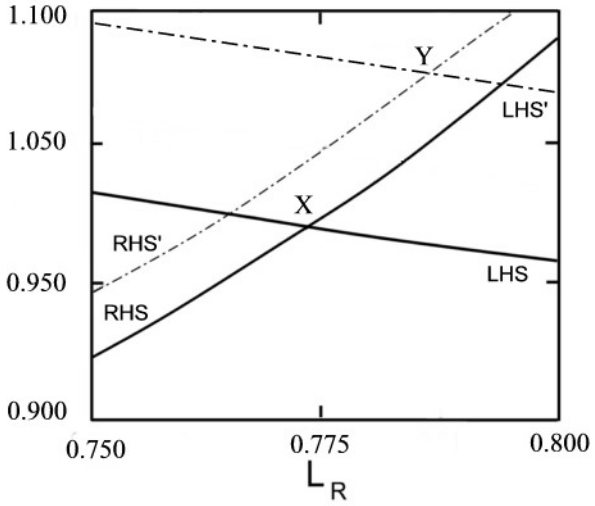

Fig.2: after policy steady state level
Cases 1A and 1B

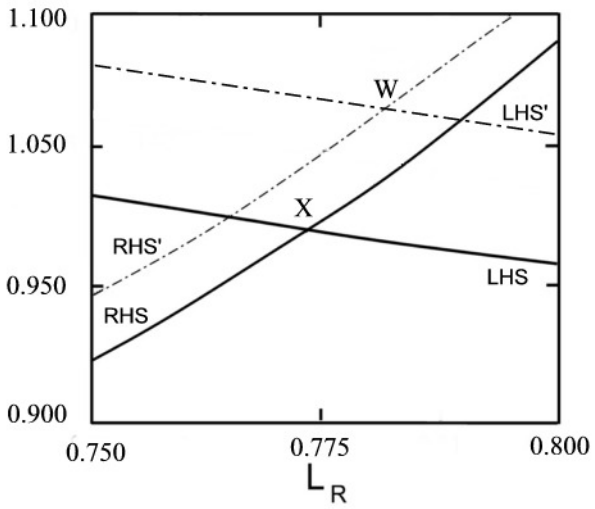

Fig.3: after policy steady state level
Case 2A

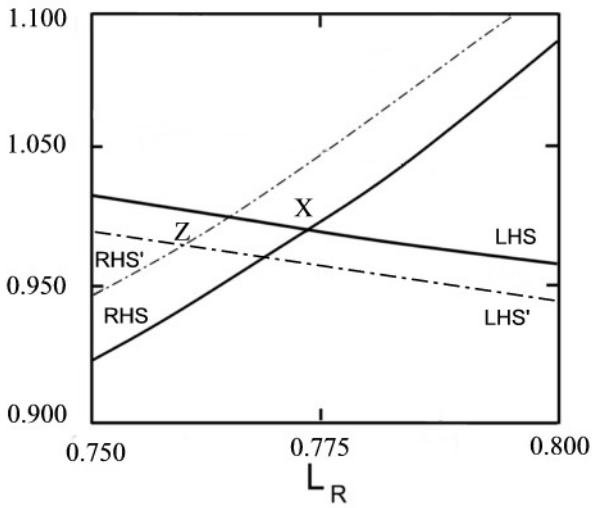

Fig.4: after policy steady state level
Case 2B